

January, 28 2003



Gunnison Basin/ Grand Valley Water Forum

LETTER OF TRANSMITTAL

Enclosed please find your copy of the Minutes and Scoping Issues from the December 10, 2002 Informational Workshop on the Colorado River Return Project, a.k.a., the "Big Straw".

The Workshop was held in Grand Junction, Colorado and was sponsored by the Gunnison Basin / Grand Valley Water Forum, a 501(c)(3) educational organization of the Colorado and Gunnison Basins.

The Workshop was empanelled with experts in their areas of expertise and given the opportunity to respond to questions from the audience. An open house preceded the Workshop.

This report is organized in two parts: The actual questions and answers and a compilation of notes organized by subject.

The Forum is available to comment further on this effort. If there are questions, please direct them to:

Butch Clark, President, GBGVWF, 970-641-2907, e-mail reclarkiii@prcs.net

Sue Kiser, Vice President, GBGVWF, 970-248-6971, e-mail SKiser@co.mesa.co.us

This information is also available on the Colorado River Water Conservation District website at www.crwcd.org.



Gunnison Basin/ Grand Valley Water Forum

COLORADO RIVER RETURN PROJECT

**A Summary of the "Big Straw"
Informational Workshop
– A Scoping of Issues –**

Grand Junction, Colorado,
December 10, 2002

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COLORADO RIVER RETURN PROJECT

a.k.a., "The Big Straw"

**Minutes of Informational Workshop,
7:00 pm, December 10, 2002
Hosted by the Gunnison Basin – Grand Valley Water Forum
Council Auditorium,
Grand Junction City Hall**

INTRODUCTION

BUTCH CLARK

Author of Colorado River Return Project

MODERATOR

DAN BELEY

Colorado Department of Public Health and Environment

PANELISTS

REEVES BROWN

CLUB 20

GREG GNESIOS

B. L. M.

GREG HOSKIN

Colorado Water Conservation Board

NIC KORTE

Grand Valley Audubon Society

ERIC KUHN

Colorado River Water Conservation District

PAT MULHERN

Mulhern MRE, Inc.

AL PFISTER

U.S. Fish & Wildlife Service

MATT SURA

Western Colorado Congress

HARRY C. TALBOT

Agriculture

JOHN TRAMMEL

Trout Unlimited

Each panelist listed issues which they felt should be looked at in the Colorado Water Conservation Board Study. These lists are attached. The questions and answers are listed below. In the interest of brevity in this document, questions and answers are paraphrased.

- Q. Al Robinson – Construction cost -benefit ratio. How close is it to 1:1? What is the time frame?
- A. Greg Hoskin –This is a reconnaissance- Level study which precedes pre-feasibility level analysis, which precedes the design process. We are just in the beginning level stages, not knowing what the cost-benefit ratios might be or if the project is even possible. The recon-level study will identify the “fatal flaws.”

If there are fatal flaws, then the project would proceed no further. CWCB looking for a firm foundation to make any kind of "proceed decision."

Q. Ed Carpenter – Dominguez Reservoir question, wants Dominguez to be part of Big Straw. DR could be a fore bay and power plant for Big Straw.

A. Greg Hoskin – This will be one of the alternatives for the consultant to examine.

Q V. Razenberger –

1. What happens if pipeline breaks?

2. How would project be financed and does Greg Hoskin have a financial stake.

A. Greg Hoskin – I am a Grand Junction water attorney, a Board member of the CWCB and have no financial interest.

Q (Speaker unknown) Water is short. What about salt and other water quality concerns, and sending that dirty water back upstream?

A. Eric Kuhn – Municipal efforts to desalinate is increasing. We are seeing that with the high cost of raw, mountain water, increased cost to treat alternative sources still makes for cheaper water.

Q Glen Miller – I am a cynic. Eastern Slope may continue to divert high mountain waters. If Big Straw is not built and Denver continues to take good mountain water they should also take their share of the salt!

A. Greg Hoskin – The idea is to use the mountain water on the west slope, then send water to the Front Range. They'll get their share of salt but it's better than no water.

Pat Mulhern – Nanofiltration and other methods could be used. There would be enormous costs for treatment but this would not be a significant cost of Big Straw project.

Q Eric Rieckle – Water conservation?

A. Matt Sura - Need exponential increase in cost of water to force conservation, to make it voluntary. However, we need some ideas that will "force" conservation. In Grand Junction, for example, there are homeowner associations that require Kentucky Blue Grass and that Xeriscaping is illegal. Is this the direction we should be heading?

Q Eric Rieckle – How will riparian lands in Utah be affected by eliminating flows going downstream?

A. Nic Korte, John Trammel & Pat Mulhern – We don't know yet. We're just in study stage now. We will be concerned with river, habitat, in stream flows, people, etc. as the CWCB study proceeds. These are issues that the consultant should study.

Reeves Brown – We're a community of "Colorado", not "East Slope", not "West Slope". We have opportunities for solutions now. This isn't just Denver's problem.

Matt Sura – There will be impacts, no doubt, but Eastern Slope needs to look into their own basins for their supply/conservation/re-use, etc.

Pat Mulhern – We have to look at cheapest alternative (conservation, re-use).

S. Consulting Geologist – Bring public into focus, public will be the ones paying the tab. Need thorough engineering studies. Water needs to be used and re-used as needed.

S. Earl Bab – I am for planning, water and transportation. Rail should be attached to pipeline for fast transit.

Q. Ron Burnam – Once Eastern Slope is done with it, will they give it back?

A. Greg Hoskin – They'd have the right to use water to extinction, i.e., it won't come back.

S. Paul Shriner – Importation of invasive plant species into Park & Summit Counties as a result of this redistribution. We have seen Tamarisk at elevations of 9600 '. The cost of this recon-level study alone is more than the weed budgets of Park, Summit, and Grand Counties together.

S. (Speaker unknown) "Mini Straw" – Pump water out of river locally, and return it back into canals could be a problem. We don't want to use and re-use dirty water.

A. Harry Talbot – There is water available. Salt Cedar, for example. Get rid of it, save water, and then re-vegetate with cottonwood and willow forests. Big source of water is soil reservoir. This is an area of further research.

Reeves Brown – Water conservation with proper forest management should be part of study,

Matt Sura – We get water from headwaters then pull it back to Eastern Slope. But what about the "short straw" concept.... From the State line to Roller Dam at the head of the Grand Valley. Recycling within Western Slope could alleviate the need for Green Mountain Reservoir and compensatory storage, resulting in dewatering the Blue River and the Colorado in between, loss of higher quality water for irrigators. Is this a higher cost than looking within the basins that need the water? Conservation?

Q. Jim Tiernahan (native of Grand Junction) - Problem is not water, it is people. But drought is real, deserts will move further north. Keep your eyes open to all possibilities, Dominguez to Palisade. Recycle. "Active environmentalism may try to stop these projects, but let's be constructive and practical."

- A. Nic Korte – Is Big Straw too narrow in scope? The U.S. uses 50% more water than Europe. So conservation really needs to be a part of the study and part of our overall change in thinking.
- A. Greg Hoskin – No dam is required. Low level diversion at state line, pump as a direct flow at a steady rate.
300 CFS = 600 ACFT, x 300 days. Results, 180,000 ACFT
- Q (Speaker unknown) Use treated water for drinking only. Use recycled for yards.
- A. Eric Kuhn – Yes, dual systems – effluent recycling (Denver Water); Also areas that the Ute system serves has non-treated water for yards and fields.
Greg Hoskin – Water from the Big Straw would be treated in wetlands for sediment, metals, etc.
Al Pfister – Concern of accumulation of sediments.
John Trammel – "Grand Valley Snow," the accumulation of salts...
- Q. Tom Long, Summit County Commissioner; Colorado Water Conservation District –
Platte River is increasing in flows at the State Line. Look to Platte River for supply rather than Western Slope. Our counties don't want contaminated water. Summit Co. is living with strict standards as it is.
- A. Pat Mulhern – Eastern Slope needs to do better – "Toilet to Tap" processing. Indirect potable re-use. Current Western Slope water should be used and re-used on Eastern Slope. Denver Aquifer should not be "mined" quickly. But over 1,000 years. I agree with Tom Long.
Greg Hoskin – Summit county exchanges clean water for Big Straw water. Opportunity for Summit County to negotiate Big Straw water to go to Eastern Slope and keep high mountain water at its' headwaters.
- Q. John Weishett, Moab; Living Rivers – Very bad idea. We will obstruct. Conservation is the way to go. Sediment/quality are big issues as are reduced flows into Utah. The river doesn't stop at the State Line.
NEPA Compliance is an issue. We will be watching that. Also this Projects affect the Colorado Canyons National Conservation Area.
- A. Al Pfister – US Fish and Wildlife Service concerns don't stop at the state line, either. Biological opinion, of course. This is a big challenge, but we usually work through the issues.
Greg Gnesios, BLM, Colorado Canyons. – How to get "Straw" into the river? 75,000 acre Black Ridge Wilderness is in this location. Many cultural resources; recreational quality of the NCA need to be looked at.
- Q. Brian McElhinney – Is there an entrepreneur to build this without government doing it? Let's really look outside the box. Put the profit into it.
- Q. Jim Spehar, Grand Junction City Council; Colorado Water Congress – Water going to Utah. Why would we send this to Eastern Slope?

- A. Greg Hoskin – This is a defensive move; Gunnison Basin is viewed by Eastern Slope. The Big Straw was originally for the protection for the Gunnison Basin. Also for Upper Colorado; California is using in excess of their 4.4 MAF.
- S. (Speaker unknown) – Buy water from Green River, pump to Grand Junction. Let Denver keep Colorado River Water.

Reeves Brown

President, Club 20

1. Cost: Is there market enough to pay for the project?
2. Water Quality: Any waters pumped upstream must not degrade the water quality of the existing stream flows when and if those waters re-enter the stream at a higher elevation.
3. Storage: Where will these pumped waters be stored at the end of the pipeline? Do we need to construct new storage facilities? If we use existing storage facilities, then we must ensure that the quality of the current storage is not reduced by the addition of the pumped water.
4. Endangered species impacts: We must be aware of potential impacts on endangered fish species within the Colorado River and avoid or mitigate those impacts as necessary.
5. Recognition of existing water rights: Any water pumped out of the river must not impair existing senior Colorado water rights further downstream.
6. Adequate water flows must be maintained in the Colorado River to meet existing Compact requirements with downstream states.

Gregory Gnesios

Bureau of Land Management

5. From Loma, Colorado to the Utah border, the Colorado River runs through the Colorado Canyons National Conservation Area, a nationally significant unit of the Bureau of Land Management.
6. The Black Ridge Canyon Wilderness is a congressionally designated wilderness area and comprises most of the area north of the Colorado Rive between Loma and the Utah border and is managed in accordance with the Wilderness Act of 1964.
7. A right-of-way would be required by the Bureau of Land Management if this proposal traverses any BLM lands.
8. There may be significant impacts to riparian systems along the river corridor within the National Conservation Area (NCA).
9. Fluctuation in river flows could adversely affect river rafting and other boating activities within the NCA.
6. An Environmental Impact Statement (EIS) would likely be required if this proposal were to traverse BLM lands, as well as major mitigation measures.
7. There are numerous cultural sites that could be affected by construction.
8. How would the proposal affect wildlife habitat and Threatened and Endangered Species within the NCA?
9. Would the proposal encourage the spread of invasive plant species into the NCA?
10. Would the proposal affect important paleontological resources within the NCA?
11. What would the project's affects be on the natural view shed?

Greg Hoskin

Colorado Water Conservation Board

10. Reason for the Study
 - a. The current drought
 - b. Growth along the Front Range
 - c. Availability of water on the west slope
 - d. Importance of utilizing the State's compact entitlement.
11. Alternatives to the construction of the CRRP to allow Colorado to develop its Colorado River Compact entitlements.
12. Alternatives to provide increased water supplies to the east slope including, but not limited to construction of other water development projects, agricultural transfers, water conservation, growth limitations, and other demand management practices.
13. The strategies will include measures taken on a local, regional or state-wide basis such as revised institutional arrangements, statutory revisions, policy changes, and new funding methods.
5. Review studies, reports or other available data.
6. Compile Water Demand Studies on the Arkansas, South Platte and Colorado River System.
7. Prepare an overview of the Colorado main stem physical environment.
8. Describe the institutional setting for water use and development in Colorado.
9. Formulate a number of project configurations to address the three water supply and demand scenarios.
10. Non-structural elements will include water rights transfers, substitutions, water leasing, revised operations of existing systems, and reduce demands.
11. Structural elements will include use of aquifers, new storage and enlargements of existing storage reservoirs.

Nic Korte

Grand Valley Audubon Society

1. **In a survey performed for the GJ City Council, nearly 3/4 of responders felt it important that the small town character be retained. 30% said that an “ideal” Grand Junction in 15-20 years would be “like it is now” or that growth be “stopped or controlled.” (Grand Junction, Nov. 2002 newsletter). Obviously the majority of city residents oppose the impact of a multi-billion dollar construction project.**
2. **Conservation measures will lower per capita consumption (lower water bills), increase agricultural yields, and reduce yard maintenance.**
 - Las Vegas reported that xeriscaping reduced water use by 80 %. (U.S. Water News, March 2002)
 - The West Basin Municipal Water District in Southern California (41 communities) is cutting water use by 50% using incentives (toilet and showerhead retrofitting), water recycling and education. Savings of 1.5 billion gallons per year are planned. (U.S. Water News, April 2001)
 - Studies in India, Israel, Jordan, Spain and the U.S. have shown that drip irrigation for agriculture reduces water use by 30-70% and increases crop yields 20-90%. (U.S. Water News, Sept. 2001). (In CA, sweet corn yields increased 65%.)
 - Home water-harvesting reduces outside watering.
3. **Conservation measures will avoid increasing the burden on the federal budget (all taxpayers) for existing downstream environmental restoration programs.**
 - Colorado River Delta (U.S. Water News, Feb. 1999)
 - Treaty with Mexico that establishes both quantity and quality of CO River water (desalinization costs)
 - Salton Sea-Congress ordered DOI to restore the sea but possible fixes could cost “billions of dollars.” (Science, April 1999)
 - Loss of freshwater and riparian species. (ESA costs were ~ 40 million/per year in 1997, Conservation Biology, Dec. 1998)

Nic Korte is a geochemist and private consultant with 25 years experience working with water contamination, water supply and surface water restoration. He is Conservation Chairman of Grand Valley Audubon Society and a member of the Western Colorado Congress.

Eric Kuhn

Colorado River Water Conservation District

1. There are four major river systems within the State of Colorado: the Platte, Arkansas, Rio Grande and Colorado.
2. Of those four river systems, the Arkansas and Rio Grande are over appropriated, water is available on the Platte River in wet years only. The Colorado River has approximately 500,000 a.f. available for future consumptive use within Colorado.
3. A number of Colorado River tributaries cross into adjacent states: the San Juan, Piedra, Animas, La Plata, Mancos, Dolores, Little Dolores, Colorado (mainstem), White, Green (Yampa) and Little Snake.
4. Of these streams, the Colorado (mainstem) is by far the largest. Its average annual flow is more than all of the other streams combined.
5. 500,000 to 600,000 a.f. of Colorado River water is diverted annually out of the headwaters of the Colorado River into the Platte and Arkansas River Basins. All of this water is diverted out of the mainstem of the Colorado River above Glenwood Springs.
6. The easy to build trans-mountain diversions were built a long time ago. Except for wet-year water, the Colorado River above Glenwood Springs is fully appropriated.
7. Front Range demands for additional municipal water will continue to grow, putting great pressure on the Western Slope for additional water.
8. Water is available for appropriation on the Colorado River below Grand Junction.
9. Moving water from below Grand Junction to the Front Range allows the West Slope to use that water first. It does not impact recreation or water quality.
10. The Colorado River Water Conservation District is supporting a study of the Big Straw Project. A study is needed to evaluate the project costs, benefits and environmental impacts.

The River District Board has not made any decision on the actual project.

Pat Mulhern

Mulhern MRE, Inc

1. Is there an Economically Viable Project?
 - Capital Costs
 - Mitigation Costs
 - Operating Costs
2. What are the Environmental Risks?
 - Downstream Depletions
 - Large Reservoir Impacts
 - Pipeline/Conveyance Impacts
3. What are the Risks of Yield?
 - Compact Issues
 - Environmental Mitigation
 - Evaporation
 - Climate
 - Transportation Losses
4. Can the Project Garner Widespread Support?
 - Environmental Groups
 - West Slope Interests
 - East Slope Interests
 - Agriculture
5. Who is the Developer/Operator?
6. How is the Project Funded?

Al Pfister

U.S. Fish and Wildlife Service

14. Potential threatened (T), endangered (E), or candidate species (C): bald eagle (T), Colorado pikeminnow (E), razorback sucker (E), humpback chub (E), bonytail (E), Canada lynx (T), boreal toad (C), yellow-billed cuckoo (C), Uinta Basin hookless cactus (T), DeBeque phacelia (C).
15. Potential species of concern: white-tailed prairie dogs, Colorado River cutthroat trout, Harrington beardtongue, DeBeque milkvetch, clay blazing star.
16. Wetlands and other waters (ponds, streams, rivers, etc.), riparian areas.
17. Potential impacts to migratory birds from associated powerlines and other above ground facilities.
18. Critical habitat for Colorado pikeminnow and razorback sucker extends from Rifle, Colorado to Lake Powell, Utah. In that reach, 150 miles of critical habitat are in Utah, including important nursery areas for young Colorado pikeminnow.
19. Critical habitat for humpback chub and bonytail occurs in Black Rocks in Ruby Canyon, Colorado and Westwater Canyon, Utah. Two of the largest populations of humpback chub occur in these river reaches.
20. The timing of the water withdrawal may alter fish and riparian habitat. Riparian habitat supports numerous species, including the southwestern willow flycatcher (E).
21. If the intake facilities involve a diversion structure, up and downstream fish movement could be blocked.
22. Fish could enter the intake facilities and be permanently removed from the river.
23. Selenium levels at the state line exceed the current state standard (4.6 µg/l) 85 % of the time.
24. Constructed wetlands may help remove selenium from the water, but the wetlands themselves could become a hazard to fish and wildlife.
25. Poor water quality could affect numerous fish and wildlife species in rivers and streams where the water is delivered.

Contact: Al Pfister, Assistant Colorado Field Supervisor, (970) 243-2778

Matt Sura,

Director of Western Colorado Congress

Is The Big Straw Study Opening A Pandora's Box?

While studying the Big Straw it is certain that the tremendous cost of the project will be seen as prohibitive. As the Colorado Water Conservation Board looks at alternatives that will 1) use our Colorado River Compact water entitlement and 2) bring additional water to the Front Range, it has already admitted it will consider a **SHORTER STRAW**. An idea that would be much less expensive is building a straw that would only go to DeBeque Canyon or the Shoshone Power Plant so the water would recycle through the Grand Valley— satisfying our water rights and leaving the better quality water in Green Mountain/ Dillon Reservoir for use on the Front Range.

This solution would satisfy the two requirements of the study as well as saving billions of dollars— but what about the interests of the Western Slope? The water in the Grand Valley is already quite high in salt, selenium, and silt. What would our water quality be like after it is recycled through the Grand Valley a few times?

The Big Straw is being sold to the Western Slope as a boon to our economy and benign to our water interests. Residents of the Western Slope should be very suspicious of this present from the Colorado Water Conservation Board.

The Big Straw Has Fatal Flaws

As Mike Serlet, chief of supply planning and finance for the Colorado Water Conservation Board said of the Big Straw and other new, large transbasin projects, "There is a reason these projects haven't been built. It's because they are dogs."

- The cost of the Big Straw has been estimated at \$5 BILLION. The cost of the pumping the water 200 miles and over 4,500 feet in elevation has been estimated at \$168 million EACH YEAR. Isn't this a fatal flaw for this project? Why is the study needed?
- The original Big Straw proposal would take poor quality water and send it to the Front Range. Where would it go? Who would want it?
- The Colorado River water near the state line is already being used for endangered fish flows. How would that issue be resolved?
- Where would the storage be located (both at the beginning of the straw and at the end?)
- How will this proposal affect the new Colorado Canyons National Conservation Area?
- Economic analysis should consider the potential economic cost of removing a large amount of water from Westwater Canyon – a premier whitewater experience that brings thousands of tourists through Grand Junction annually.
- What else could be accomplished with the \$500,000 the Big Straw study is estimated to cost?

Let's Plan Before We Build

Colorado must plan for our future water needs. The legislature must require enforceable growth plans for cities and counties that allow development only when and where there are sustainable water resources available to support it. We must also commit to basin level planning that considers current and future needs, how water **within the basin** can meet those needs, and how efficiency and conservation can be implemented to meet shortages. Until that planning is done, the Front Range has no business asking the Western Slope to solve their water shortages.

Harry Talbott

Agriculture

1. When the big straw has been studied it will become obvious that there are scientific and political obstacles which cannot be overcome. It will then become obvious to most that it will be better to work with nature than against it to increase usable water supplies.
2. Approximately 81 percent of the precipitation that falls on Colorado returns to the atmosphere.
3. The water held in the rocks and soils of the state comprises by far the largest reservoir of potentially available water.
4. This potential source of water is only partially understood and only a small percent is being used.
5. Watershed yield can be greatly enhanced by proper vegetation management.
6. Watersheds can be managed for maximum groundwater and aquifer recharge.
7. Studies indicate that streamside control of certain water guzzling plants can make large quantities of water available

John Trammel

Trout Unlimited

Trout Unlimited's mission: To conserve, protect, and restore the cold-water fisheries of North America and their watersheds. Protecting a watershed usually includes opposing out-of-basin transfers of water. However, CARP is an imaginative proposal which Colorado Trout Unlimited is not prepared to oppose without learning more about it. Currently, we raise these questions and concerns.

1. What effects would there be from removing large quantities of water from occupied habitat for endangered species on the Colorado River - and how would permits ever be secured in light of ESA issues?
2. It seems likely that additional reservoirs would be required. What would be their locations, and what would be their environmental and economic costs?
3. What would be the effects on wildlife of transferring warm water into cold-water environments?
4. CARP proposes to remove Se and other contaminants by means of a constructed giant wetland. Will it be effective in providing water quality at a level at least equal to that of the receiving waters? How much time would be required before it could begin to deliver clean water to the pipeline? How long would its lifetime be? What would be the losses caused by evaporation, transpiration, and losses to the surrounding sediments and rock? If this technique doesn't work, what would be the cost of conventional treatment?
5. What kind of firm yield could CARP provide under the Colorado River Compact? How sure are we that 280,000 A-F will be available? Colorado doesn't get a guaranteed quantity of water under the Compact, but rather a proportion of the river's yield. What would happen to CARP users and other users on the Western Slope should there be a "Compact call" requiring Colorado to deliver water to the downstream states?
6. If CARP took all of Colorado's remaining entitlement, what would be the effect on other Colorado water users in the future?
7. What would be the environmental costs of the construction of the pipeline and infrastructure?
8. Are there really no environmental and economic obstacles to the pipeline if it follows rivers and highways? Glenwood Canyon comes to mind.
9. What would be the unintended adverse consequences? (Answer: We don't know yet.)
10. Given the likely enormous costs, environmental effects, and water-quality challenges that the project faces, why should Coloradoans spend \$500,000 studying this project at a time of major budget difficulties for the state?

COLORADO RIVER RETURN PROJECT

a.k.a., "The Big Straw"

Scoping Outline for Study of the Colorado River Return Project

Summary outline of comments made at the meeting held in Grand Junction on December 10, 2002 to suggest scoping for a proposed study of the Big Straw concept.

General Comments On Process:

- Study and analysis of the project should be commensurate with the project's large scale and with the extensive breadth of its potential impacts.
- The Colorado Joint Review Process should be used to structure the study.
- Create a web site allowing access to reference materials and developed information and to encourage public participation from within and beyond Colorado.
- Foundation material placed on the web site should include baseline economic profiles, quality of life profiles, infrastructure capacities, and utilization trends or absorption rates for existing infrastructure within potentially affected counties.
- Given the breath and scope, multiple opportunities for public participation should be provided to guide and "fine tune" the study as it progresses.
- The study should reflect lessons gained from previous experience with large projects and with boom and bust situations in Colorado and elsewhere.
- Coordination with local governments should produce reliable identification about needs and timing for any new infrastructure requirements, affordable housing needs, and allocation of anticipated cost burdens.
- Procedures for timely monitoring and early notification of possible interruptions of both the study and the project should be established.

Information Requirements And Issues That Should Be Addressed

1. Design Considerations

- identify at each level of study (reconnaissance, pre-feasibility, and design) any "fatal flaws" and consider whether to proceed.
- enable means to better cope with drought conditions, meet demands of growth for water along Front Range of Colorado, allow development of Colorado's Compact entitlements, to not compromise future use and water transfers and development on Western Slope, and to allow first use of water on Western Slope.
- consider project, alternatives, and opportunities from statewide and multi-state perspectives.
- consider what else could be accomplished with expenditure of \$500,000 on study, particularly given present budget constraints.

2. General Overviews Required

- of past studies, report, and other available data on basin, regional, and multi-state needs for water .
- of unexpected and adverse consequences associated with undertaking other very large scale projects and how these were handled .
- of existing conditions, trends and possible data sources on water quality.
- of physical environment in Colorado River Basin, of institutional setting for water use and development in Colorado, of future water needs within basins of origin, of evaluation and comparison of estimates for costs, benefits, and environmental impacts associated with similar projects.
- of potentials and opportunities for efficiency and conservation and of examples for appropriate planning to meet water needs within each basin with resources from within the basin.
- to identify opportunities to complement or conflict with other projects, proposals, plans, and policies and for determination of consistency and excessiveness in resource development.

3. Project Ownership And Finance

- assess financial ability to carry out project and market potential for the product of the project.
- identify fiscal consequences upon budgets for other environmental restoration.
- examine potential project consequences for determination of consistency and possible excessiveness in resource development.
- identify considerations for determining whether the project might be built privately and other opportunities for private financial involvement.

4. Consideration Of Alternatives

- revision of institutional arrangements, statutes, policy, and new funding methods.
- how Eastern Slope might return water after use.
- a less expensive and SHORTER STRAW recycling water on Western Slope and consequences of recycling water.
- consider specifically the proposed Dominguez Reservoir as a component of the project, specifically as fore bay and power plant.
- consider consequences from application of new technologies such as those to desalinate and recycle water.
- identify and respond to specific reasons why similar proposal have not been built.
- identify and evaluate potential for non-structural solutions, water transfers, revised operations of existing facilities, demand management and reduction, use of aquifers, repair and enlargement of existing storage, new storage requirements to achieve similar objectives.
- improvement of water quality and conservation measures so as to lower costs and to manage water demand and supply requirements.

- consider rail transport of water and/or joint construction of pipeline and rail line.
- consider a longer pipeline from the Green River, past Grand Junction, and on to the Front Range.
- work with nature and vegetative management of watersheds to increase usable water supplies.

5. Permitting

- identification of potentially relevant laws, policies, permitting, and mitigation requirements for access and right-of-ways across federal, and state lands.
- consultation and public involvement requirements .

6. Project Feasibility

- set out standards and procedures for evaluation and comparison of economic feasibility with respect to construction costs, mitigation and monitoring costs, community impact and infrastructure costs, finance and debt costs, maintenance and operational costs, ancillary costs, connection and distribution costs, funding, repayment capability, financial sensitivity and risk analysis, timing of repayment, and rate of return on investment.
- identify the cost-benefit ratio, key assumptions, and relevant time frame.

7. Construction, Operations, and Maintenance

- identify economic and employment considerations of project construction, operation.
- identify consequences of interruptions to construction or operation, and of project termination.
- identify difficulties and options for coping with environmental and economic consequences of pipeline construction through difficult places such as canyons and communities, and safety considerations such as in the event of a pipeline break.
- determine whether project construction would be a boon to local and state economies and would it create a boom and bust impacts.

8. Water Quantity

- identify legalities with regard to existing rights, agreements, contracts, compact commitments, federal programs and policies, reservoir and groundwater storage operations and then determine quantities remaining available under historical and projected fluctuations in seasonal and yearly supply.
- identify potential statewide consequences of committing the remaining entitlement under Colorado Compact to this project.
- identify consequences of further dewatering within headwaters if a Shorter Straw alternative recycles water farther downstream within the basin.
- cooperation with other water interests to identify risk to yield from compact obligations, environmental mitigation, evaporation, climate change, and transportation losses.

9. Water Quality

- assemble USGS data on water quality at possible diversion sites to determine effects on downstream water quality, Selenium levels, existing water uses, use classifications and standards, and particularly upon fish and wildlife species and recreational activities.
- assemble data to determine water quality consequences, particularly with respect to salinity, upon rivers and stream into which water is delivered and upon costs for treatment of delivered water.
- determine consequences to water quality of recycling water several times if water is returned at headwaters of Colorado River Basin by a Shorter Straw alternative.
- determine water quality consequences and potential for degradation to streams and reservoirs receiving water.
- identify consequences to fish and wildlife from changes in water quality downstream in Utah, to treaty considerations with Mexico, and to programs for restoration of the Salton Sea.
- identify consequences to fish and wildlife of using wetlands for water quality enhancement and particularly of resulting higher concentrations of selenium within the wetlands filtration system.
- identify water quality implications to groundwater.
- determine opportunities and consequences of trading in water quality such as by exchange of returned water for high quality water presently diverted from headwaters.

10. Wildlife, Fisheries, Vegetation, Wetlands, Riparian Areas

- identify impacts and significance to functions of wetlands and riparian areas, particularly within the Colorado Canyons National Conservation Area.
- identify effects upon wildlife, fisheries, and wetlands from introducing warm water biota into cold water habitats and from possible transfer of biota from the Western Slope to Eastern Slope streams.
- determine impacts and mitigation and/or replacement requirements for threatened and endangered species as listed or under consideration for listing.
- determine impacts and mitigation and/or replacement requirements for areas designated for critical resource management.
- identify and determine extent of stream bed and land surface disturbances such as for excavation and/or disposal and also determine requirements and costs to control spread of invasive plants.
- identify design requirements for facilities and operations to minimize adverse effects such as to mortality of migratory birds and fish entrainment.
- identify significant distant consequences such as to restoration and maintenance of Colorado River Delta, air quality on Front Range, and recovery of endangered species in the South Platte Basin.

11. Wilderness And Roadless Areas

- Identify impacts and options so as to avoid adverse impacts to these areas with project facilities such by placement of pipeline and transmission lines.

- Identify impacts and options to reduce impacts to visual and auditory values.

12. Recreation

- Identify impacts to recreational experience and tourist features along with options for avoidance or mitigation of adverse impacts upon these resources and with particular attention to river rafting within Colorado Canyons NCA.

13. Cultural Resources

- Identify adverse impacts upon cultural, archeological, and paleontological resources and options for avoidance.

14. Social

- Many are likely to oppose and their reasons need to be determined and well as reasons for support.

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